number and value of machine tool shipments reported by type of machine tool by respondents were used with the corresponding industry data reported by Census to develop factors to expand producers reported annual production capacity and average annual inventory into industry estimates. Actual and anticipated changes in annual production capacity reported by respondents were used to update 1982 annual production capacity to a current estimate. Estimates reported by respondents of their ability to expand capacity under a national emergency were used to project capacity growth by type of machine tool for three years.

The following definitions were used consistently throughout the survey questionaire as a basis for reporting information:

- Firm--An individual proprietorship, partnership, joint venture, association, corporation, business trust, cooperative, trustees in bankruptcy, or receivers under decree of any court, owning or controlling one or more establishments as defined below.

- Establishments--All facilities in which metal-cutting and/or metal-forming machine tools valued at $2,500 or more each are produced. Includes auxiliary facilities operated in conjuncton with (whether or not physically separate from) such production facilities. Does not include wholly owned distribution facilities.

- United States--The term "United States" includes the fifty States, Puerto Rico, the District of Columbia, and the Virgin Islands.

- Metal--The term "metal" includes all types and grades of primary and alloyed ferrous and nonferrous metals.

- Metal-working Machine Tools--Includes all new metal-cutting and/or metal forming machine tools valued at $2,500 or more produced in the United States as listed under the U.S. Standard Industrial Classification (S.I.C.) 4-digit code numbers 3541 and 3542. Machine tools assembled in the U.S. primarily (i.e. more than 50% of value) from imported components are not considered produced in the U.S. and are not included.

- Shipments--Includes machine tools assembled or partially assembled shipped from plants, including inter- and intra-company transfers. Includes complete machines

manufactured for a firm by others on a subcontract basis. Excludes complete machines produced for others on a subcontract basis, unless manufactured for an affiliated company.

- Domestic--includes shipments to destinations within the 50 States, Puerto Rico, the District of Columbia, the Virgin Islands, and the U.S. Armed Forces abroad for their own use. All other shipments are exports.

- Inventory--Includes assembled machine tools and the number of machine tools which can be assembled from only those components in stock at facilities or other locations including consignment.

- Export Shipments--Includes assembled or partially assembled machine tools exported by a company, or shipped to related companies such as D.I.S.C., or others, such as distributors or brokers, to be exported.

- Numerically Controlled (NC/CNC)--Includes machine tools built with an NC or CNC control, or with an interface for a numerical control.

- Annual Production Capacity--The maximum annual capacity production rate under emergency conditions (e.g. military mobilization), with production machinery on hand (including idled), time allowed for maintenance and repairs, assuming ample work force, production materials and supplies, utilities, etc., based on best product mix during each reporting year for efficient operation whether or not the machines were built during the reporting year.

- National Emergency--For the purpose of this survey, a national emergency is defined as a 1 year mobilization, which would be continued throughout a three year, two-front war. In a national emergency, the U.S. Governmemt would administer controlled materials and and assign priorities to production, as was done during World War II and the Korean conflict.

b. Machine Tool Shipments, Capacity and Inventory

Shipments reported by survey respondents for the 1978-1982 period follow the pattern reported by Census for the industry as a whole. Reported shipments increased steadily from $2,169.9 million in 1978 to $3,728.2 million in 1981, reflecting the protracted growth in industry shipments which occurred during that period. Shipments began to decline in 1982, indicating the beginning of the decline in machine tool orders which lasted into 1983. To a large degree the

survey data on shipments, capacity and inventory can be taken as a best case representation of the industry, showing the prolonged industry growth which occurred between the machine tool recessions of 1975-1976 and 1982-1983.

Annual production capacity is reported to have increased throughout the 1978-1982 period, both in terms of units and value, from 54,240 units valued at $3,856.2 million in 1978 to 75,544 units valued at $7,243.4 million in 1982. However, the metal-forming sector reported unit declines in 1981 and 1982 falling from 17,719 machines in 1980 to 16,731 machines in 1982. Further analysis of capacity by type of machine tool indicates boring machines, non-NC turning machines, non-NC punching and shearing machines and forging machines experienced declines in domestic capacity from 1978 to 1982. Only gear cutting machines, NC turning machines, machining centers and "other metal forming" machines experienced growth in capacity each year from 1979 to 1982. The other categories exhibit various patterns of increase and decrease through the period. The statistical tables compiled from the survey are attached in the Appendix.

For most categories of machine tools, U.S. emergency production capabilities have increased during the 1978-82 period. It should also be noted that capacity increases are substantial for the more productive numerically controlled metal-forming machines, e.g., capacity to manufacture NC punching and shearing machines increased over 100 percent during the 1978-82 period and capacity to manufacture NC bending and forming machines increased almost three-fold. On the other hand, capacity increases in the NC metal-cutting areas were much less impressive.

Based upon the responses to the DOC survey it is projected that there will be almost no growth in domestic capacity during the 1983-85 period. The total 1982 capacity of the industry is valued at $9,715.7 million. It is anticipated that there will be less than a 1 percent capacity decline in 1983, less than a 1 percent decline in 1984 and less than a 1 percent increase for 1985. Furthermore, if capacity utilization levels remain low, it is possible that the U.S. industry will begin to lose both capital stock and skilled labor capabilities during the 1984-85 period and during the latter part of this decade.

The survey indicates that 22,772 units valued at over $1 billion are held in inventory by domestic manufacturers. It

is expected that these machines can be made available during the mobilization year because they are physically located within the U.S. It should also be noted that inventories will tend to delay any increase in the level of capacity utilization in the industry when the market improves.

The survey responses indicate the potential for expansion of annual production capacity under mobilization conditions. Respondents indicated they could increase capacity 25 percent in 10.4 months, 50 percent in 19.4 months and 100 percent in 32.1 months assuming existing production facilities were fully utilized (maximum capacity production rate) and assuming untrained human resources. It is estimated that current mobilization capacity for the entire metal-cutting and metal-forming industry is 175,044 units valued at $9,675.2 million. By the end of the third year of mobilization, it is projected that capacity could increase to 347,988 units valued at $19,234.3 million.

However, it should also be pointed out that skilled operators were the most mentioned bottleneck to a production surge.[2] Of 182 respondents, 139 or 76.4 percent mentioned skilled operators as a bottleneck. Raw materials, (78 mentions or 42.9 percent[3]) and machines, (70 mentions or 38.5 percent,) ranked second and third as most likely bottlenecks.

c. Employment

Survey respondents reported 1982 average employment of 56,639 workers of which 28,214 were production workers. By June 30, 1983 the number of production workers employed by respondents had dropped to 19,235. This decline reflects the general downturn in the machine tool industry and provides a backdrop upon which to evaluate respondents' estimates of production worker absorption through three years of mobilization. Respondents indicated they could absorb 10,919 production workers in the first year of a mobilization, 9,641 in the second year and 9,576 in the third year assuming necessary training, no serious disruptions to manufacturing operations and the usage of only existing production equipment.

2. Machine Tool Importers Survey

Machine tools held in inventory by U.S. importers contribute to domestic availability in a mobilization. The Department therefore conducted a survey of U.S. importers of foreign machine tools to determine the level of inventories for each category of machine tool under investigation.

a. Survey Response and Methodology

A total of 74 importers of new, complete, metalworking machine tools valued at $2,500 or more each responded to the survey. Survey respondents reported 1982 imports of 12,465 machine tools valued at $444.4 million. This represents 35.3 percent of the total units reported by the U.S. Bureau of the Census in 1982 and 38.8 percent of the value. This represents a significantly lower response rate than that received for the domestic manufacturers survey. Over the five year survey period, 1978 to 1982, respondents accounted for as much as 48.8 percent of imported units and 47.5 percent of imports by value. The number and value of machine tool imports reported by type were used with corresponding import data published by Census to develop factors to expand importers reported inventory into estimates of total inventories of imported machine tools in the United States.

b. Machine Tool Inventories

Survey respondents reported inventories of machine tools growing without pause from 1,861 units valued at $41.7 million in 1978 to 5,417 units valued at $204.6 million in 1982. Reported inventories of metal-cutting tools increased from 1,680 machines valued at $37.2 million in 1978 to 4,971 machines valued at $190.6 million in 1982. Reported inventories of metal-forming machines increased in terms of value from $4.5 million in 1978 to $13.0 million in 1982 and in terms of units from 181 in 1978 to 446 in 1982.

Inventories reported by type of machine in 1982 ranged from none reported for station types, forging and other metal-forming to 1,869 for non-NC turning. In value terms the largest category was NC turning, 824 machines valued at $85.7 million, and the second largest was machining centers, 339 machines valued at $39.5 million.

Total inventories of imported machines in the U.S. in 1982 were estimated at 17,619 and valued at $479.5 million. Metal-cutting inventories were estimated at 14,542 machines valued at $442.0 million and metal forming at 3,077 machines valued at $37.5, million.

These machines are physically located within the U.S. and therefore could be made available during the mobilization year. It should also be noted that foreign inventories may tend to depress the demand for U.S. machine tools as the market improves.

3. Defense Industrial Equipment Center (DIPEC)

Machine tools held by the Federal government also would contribute to total available supply in an emergency. In the event of a mobilization, the 12,641 machines being held in the Defense Industrial Plant Equipment Center would be made available. However, only 193 of these machines are numerically controlled. The majority of the machines are over twenty years old. DOD has informed us that most machines in the DIPEC would require extensive renovation to bring them on line.

C. Import Reliability

The Department's assessment of the import reliability of machine tools under mobilization conditions is based on a number of analyses from the foreign policy, national security, intelligence and crisis management communities. The following is an outline of overall import reliability assessments based on the interagency contributions received. (U)

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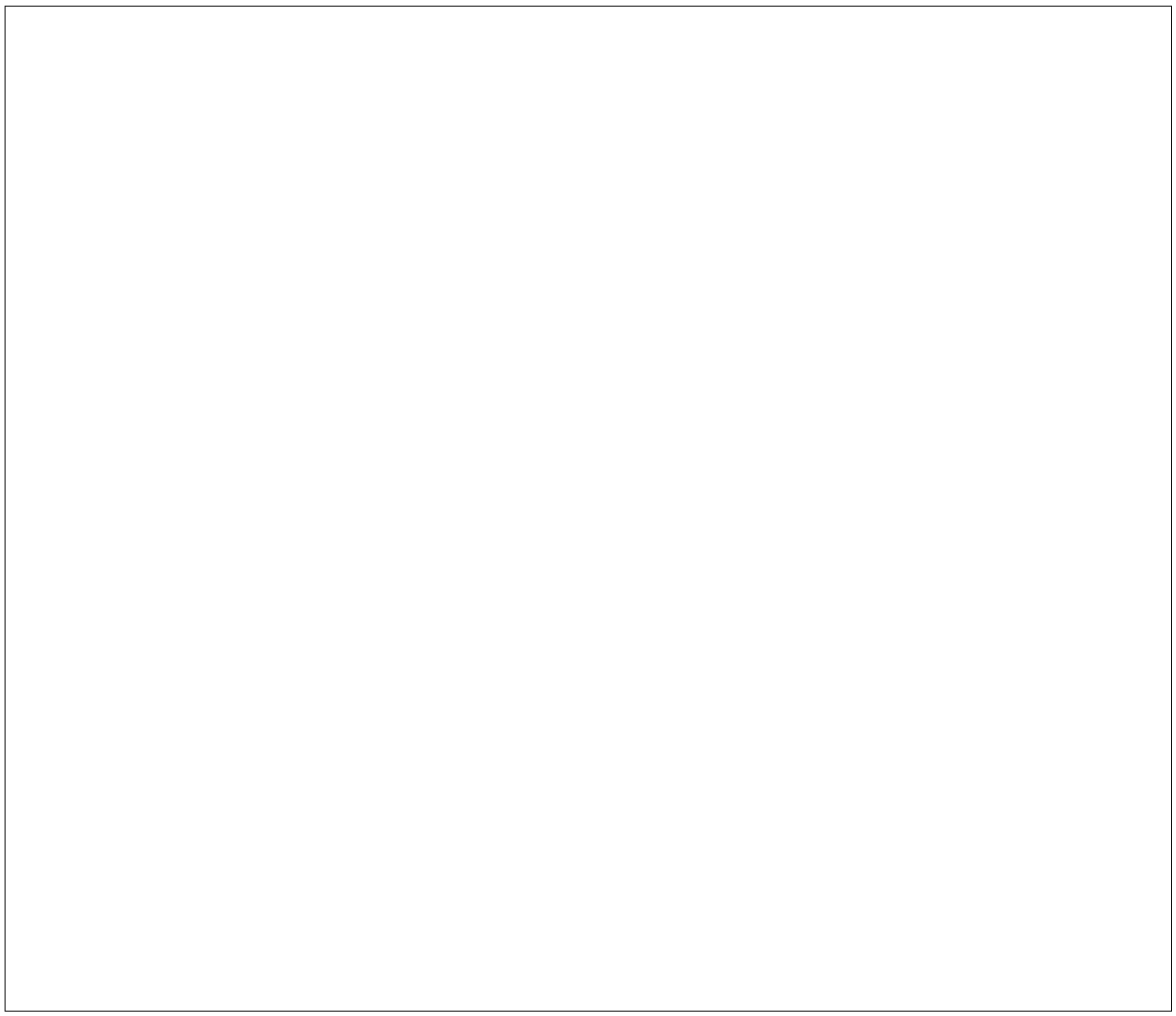

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2. Foreign Policy and Political Considerations

The Department of State has determined that the major foreign machine tool manufacturers are politically reliable and could be expected to assist the U.S. in a crisis. State explicitly notes that most of these countries are "treaty allies and nations that share our goals and aspirations." (S)

The CIA amplified the State Department's political reliability assessment by noting that, in the event of a mobilization, Japan could be expected to shift available material, energy and shipping capacity normally used for consumer durables to the machine tool industry. (C)

3. Logistical and Industrial Considerations

Although the political reliability of the major U.S. machine tool trading partners is considered to be high, there are a number of factors which reduce our confidence in the U.S. ability to obtain machine tools under wartime conditions. (S)

Specifically, the mobilization scenario specifies major reductions in crude oil availability from the Persian Gulf. One can also assume a discontinuation of Soviet oil and gas deliveries to Western Europe after the outbreak of hostilities, if not sooner. Although the U.S. purchases no Soviet energy and has reduced significantly its reliance on insecure foreign oil imports, this is not the case for many of our allies. Although many of these countries may be willing to reallocate energy and raw material supplies within their domestic economies to assist U.S. wartime objectives, the availability of supplies to reallocate would be severely restricted. (S)

Based on a comprehensive analysis of energy availability during a mobilization, the Department of Energy states that "one can assume a priori that the ability of Japan, France, West Germany, Italy, Switzerland and the United Kingdom (countries identified as the major exporters of machine tools to the United States) to manufacture machine tools would definitely be severely hindered." (S)

For example, DOE points out that by M +70 days crude oil,

natural gas liquids and feedstock imports would be reduced by 53% to Japan, 51% to France, 35% to West Germany, 48% to Italy and 45% to Switzerland. With regard to solid fuels, DOE has informed us that by M +70, Japan's imports could be reduced by 39%, and that imports by the other major machine tool suppliers would be reduced by about one-quarter. Given the fact that all these countries are heavily dependent on foreign supplies to meet domestic demand, import reductions of these magnitudes can be expected to severely constrain industrial capacity, including that of the machine tool industry. A comprehensive energy availability assessment for our major machine tool trading partners is attached in the Appendix. (S)

The limited availability of raw materials would also cause a major problem for our allies. The National Defense University has informed us that:

> "While the U.S. is not self-sufficient in all of the commodities needed to produce steel, it is far better off than its allies and Japan. For the most part, with the exception of some critical alloying metals such as chromium and manganese, U.S. foreign dependence is due mainly to economic reasons rather than to a deprivation of mineral resources and reserves. This is not the case for U.S. allies in Western Europe and Japan who must depend on foreign and often distant sources for many of their essential raw materials."(U)

For example, Japan must import virtually all of its manganese, iron ore, chromium and nickel - a majority of which must pass through the Indian Ocean. This situation is further exacerbated because Japan has limited stocks of critical raw materials for machine tool production and these are largely held by private industry. Furthermore, the CIA has informed us that Japan has no emergency mobilization plan and that its Defense Agency has not been able to obtain the cooperation of other agencies so that civilian resources may be mobilized in a crisis. (C NF)

NDU also informs us that:

> "Given the growing Soviet naval capabilities in northeast Asia, together with expanding capabilities to project forces and sustain operations in the Indian Ocean, west coast of Africa and Southeast Asia, the threat to disrupt the flow of raw materials for Japanese industry can be accomplished with only limited resistance by either U.S. or other regional forces. The sea lanes of communication (SLOC's) which pass through numerous chokepoints and which are vulnerable in the vast open ocean areas of the Indian Ocean and East Asian waters, represent easy targets for Soviet air and naval forces." (U)

4. Wartime Considerations

The military aspects of the scenario further complicate import reliability for machine tools. The CIA/DIA assessment of West European and Japanese reliability is provided below. (U)

Western Europe

Western Europe should be considered to be totally reliable and fully capable of supplying machine tools throughout the mobilization period. There will be some disruptions as war becomes imminent; however, it is expected that the European machine tool industry inter alia will not be the prime target of disruptive activity. It is expected that as the postulated invasion progresses, West Germany will cease to be a source of machine tools, regardless of the depth of the invasion. (S NF)

France, Belgium and Luxembourg will experience greater military pressure as the invasion progresses and as the Soviet conventional reach increases. Exports of machine tools will be a function of decreasing capability for air and/or sea lift. If these countries are over-run, there will be no exports to the West. (S NF)

Great Britain will experience added military pressures. Continued supplies of machine tools will decrease, though probably not to the degree experienced by France and BENELUX. (S NF)

Italy will probably also become a nonexporter of equipment as the war progresses, though they may be able to supply the U.S. for a slightly longer period than the rest of Europe. (S NF)

Sweden and Switzerland will probably not be reliable if West Germany and France fall. The Soviets would by fiat have achieved air superiority, thus cutting transport capability. (S NF)

Reliability is totally dependent on the depth and success of the Soviet invasion and the resultant reach beyond the front. Finally, as a worst case, if the Soviets are successful in the initial invasion and reach the objective of European domination, the likelihood of a European industrial base capability remaining is nil, even after a subsequent U.S. success in pushing them back to prewar positions. (S NF)

Conclusion: In view of these intelligence and military assessments and the industrial damage estimate set forth in the scenario, we have concluded that the U.S. can depend on obtaining machine tool deliveries from Europe during the

mobilization period. However, after this period, the West European ability to supply the U.S. with essential industrial products must be considered uncertain at best. (S)

Japan

During the pre-conflict mobilization period, the United States could maintain access to Japanese machine tools. (C)

During the initial stages of the conflict, Soviet forces would be focusing on high-priority military missions -- neutralizing the China threat and the U.S. air and naval forces in the northwest Pacific. At this stage, the Soviets would not be willing to divert the substantial resources that would be required to destroy Japan's disbursed machine tool industry, close its large number of ports, or interdict Japanese shipping. (C)

Depending on how the conflict progressed, the Soviet Union might be able at later stages of the war to allocate more forces to interdiction. The Soviets could deny the United States access to Japanese machine tools if they managed to win air superiority over all of Japan. Even partial air superiority could significantly degrade Japan's ability to supply the United States. (C)

Conclusion: A greater degree of import reliability is assumed for Japan than for Western Europe because: 1) Japan enters the war at a later date; 2) Japan is not subject to a full scale invasion; and 3) at least during the initial phases of the conflict, the USSR may be preoccupied with military operations in other areas. However, in view of the NDU/CIA/DIA assessment, it would be imprudent to rely on Japan as a major supplier of machine tools during the entire conflict. After the mobilization period, Japanese reliability would depend in large measure on military, economic, and trade variables that are, to a large extent, uncertain. Therefore, for the purpose of this investigation, confidence in Japan's dependability as a machine tool supplier is reduced three months after their entry into the war. (C)

5. Lead-times for Delivery of Foreign Machines

In order to set forth a comprehensive import reliability projection, one must assess the ability of each country to manufacture each category of machine and the lead times they require to deliver the machines to the U.S. Department of Commerce industry experts have developed Table VI-2 which estimates lead times for machine tool imports from the major producing countries under optimum conditions. Delivery lead

Table VI-2

Lead Times for Delivery of Foreign Machine Tools to the U.S. *

	Japan	West Germany	U.K.	Taiwan	Switz	Italy	Canada	Sweden	Spain	France
Boring	12	12	12	NA	15	15	15	15	12	15
Drilling	4	6	5	4	6	6	6	4	6	6
Gear cutting	9	9	9	9	9	9	9	9	9	NA
Grinding	6	7	6	6	9	9	NA	9	9	6
Hor NC Turn Lathe	6	9	9	7	9	9	NA	9	NA	9
Ver NC Turn Lathe	10	12	12	12	12	12	12	12	NA	12
Non NC Turn	6	6	6	5	6	6	9	NA	6	6
Milling	6	6	6	5	5	6	6	6	6	6
Machining Center	9	9	12	12	12	12	NA	12	NA	12
Station type	NA	12	NA	NA	12	NA	12	NA	NA	NA
Other	-	-	-	-	-	-	-	-	-	-
NC Punch/shearing	6	7	7	NA	9	NA	9	NA	NA	9
Non Punch/shearing	4	5	4	5	4	5	4	4	4	4
NC Bend/forming	6	6	6	6	4	4	4	4	4	4
Non Bend/forming	4	4	5	5	5	4	4	4	4	4
Press	15	15	12	15	12	10	10	12	10	15
Forges	NA	12	12	12	12	12	12	NA	NA	12
Other	-	-	-	-	-	-	-	-	-	-
EDM	3	3	3	NA	3	NA	NA	NA	NA	3

NA - Not applicable - country does not demonstrate significant capability to produce machines.

* - Assumes no interdiction of transportation, no shortages of critical materials or any physical damage to industrial capacity.

SOURCE: Department of Commerce
Bureau of Industrial Economics

times are based on no transportation interdiction, no shortages of essential materials, or any physical damage to industrial capabilities.

As this table demonstrates, the U.S. will be able to import most categories of machine tools from the major free world manufacturers during the mobilization period. Subsequently, the U.S. can expect to obtain imports for the duration of the conflict from friendly and allied countries who are not in the war zone, (e.g., Canada can export most categories of tools during the mobilization period and during each year of the conflict.) (U)

D. Conclusion

For most categories of machine tools, it is anticipated that the U.S. will be able to meet its requirements for a three year war preceded by a one year mobilization through a combination of domestic production, inventories and reliable foreign supplies. However, in a number of cases, the shortfalls are of such a magnitude and/or the lead times for delivery are sufficiently long that there is doubt regarding the U.S. ability to meet mobilization requirements. The machine tool categories which present the greatest potential problem include boring machines, forging machines, grinding and polishing machines, NC turning machines, machining centers, and station type machines.

The next step in the analysis is to determine whether imports are a principal cause for any anticipated shortfalls.

NOTES TO CHAPTER VI

1. The Emergency Mobilization Preparedness Board approved new mobilization scenarios on August 10, 1983. Military expenditures patterns for the new scenarios have not yet been developed. With the objective of using the most current mobilization guidance, we used the new scenario to establish military and geopolitical parameters. However, military expenditure patterns were, of necessity, based on projections that had already been developed based on previously approved mobilization scenario for a one year mobilization period and three years of conflict.

2. Because machine tools are a capital good, the standard input-output approach of multiplying a bill of goods by a total requirements matrix to determine production requirements will not suffice. A capital input-output table is needed to determine each industry's additional requirements for plant and equipment during a mobilization emergency. The standard input-output table deals with intermediate transactions in goods and services used immediately for production, all capital goods are shown as output to final demand. A capital input-output table is a detailed expansion of these sales to final demand by industries purchasing capital goods and by those industries producing capital goods. These purchases are related to capacity and capital stocks to form a capital input-output table. With this table, changes in capital stock necessary to meet projected levels of output can be determined.

3. Labor availability is discussed in greater detail in Chapter II of this report.

4. In the event of a national emergency, materials would be made available to key industries from the Defense Stockpile of Strategic and Critical Materials. The stockpile goals are based on the same mobilization scenario used for this investigation.

VII. EFFECTS OF IMPORTS ON THE NATIONAL SECURITY

In making a finding regarding the impact of imports on the national security, an evaluation was made of changing market patterns, past, current, and prospective domestic production capabilities, import penetration in each product line, and the availability of foreign supplies under crisis conditions. To find that imports of machine tools pose a threat to national security, it is necessary to determine that the shortfall of anticipated supply in relation to mobilization requirements is the principal result of import penetration.

A. Summary

Based on the requirements of the statute and regulations, negative findings were reached for the following machine tool categories:

drilling machines;
gear cutting machines;
grinding and polishing machines;
non-NC turning machines;
milling machines;
station type machines;
other metal-cutting machines;
NC punching and shearing machines;
non-NC punching and shearing machines;
NC bending and forming machines;
non-NC bending and forming machines;
presses; and
other metal-forming machines.

Although the reasons for each specific finding differ by category of tool, the negative findings are based on one of the three basic factors set forth below:

- Mobilization requirements can be met by domestic production capabilities, inventories, and/or interproduct substitution;

or,

- reliable foreign supplies can compensate for projected supply shortfalls;

or,

- when shortfalls cannot be met by total available supplies, it could not be demonstrated that imports threaten the U.S. capability to obtain the requisite supplies to meet a national security emergency.

Positive findings were reached for

boring machines;
horizontal NC turning machines;
vertical NC turning machines;
machining centers; and
forging machines.

Although the reasons for the specific findings differ by category of tool, general reasons for the positive findings are set forth below:

- o Total available anticipated supplies from domestic production, inventories and reliable foreign suppliers do not meet mobilization requirements. And,

- o import penetration is rising to levels that either cause the loss of U.S. production capabilities or inhibit the growth of the industry needed to meet mobilization requirements.

B. Analysis

In many cases, U.S. machine tool production capacity plus available inventories cannot meet requirements for the mobilization period and the initial phase of the projected conflict.[1] It is during this timeframe that demand for machine tools is highest and production capacity expansion is not yet at peak levels. During the later phases of the projected conflict, it is anticipated that domestic production can meet and exceed declining requirements. The Department recognizes, however, that it is imperative for the U.S. to be able to meet its machine tool needs in the early phase of any war in order to ensure that the course of military events does not turn against the U.S.

In many cases, the above noted anticipated machine tool shortfalls can be met by reliable foreign suppliers. Negative findings were reached in all such cases. When it was not certain that total available supplies would be available to meet a shortfall, the following factors were reviewed before considering a positive finding that imports and not other economic factors caused the condition which threatens the U.S. ability to meet machine tool requirements:

- o substitutability of an alternative machine to alleviate an anticipated shortfall;

- o the level of import penetration over a multi-year period;

- o the absolute number of imported machines over a multi-year period;

- o changes in levels of domestic shipments over a multi-year period as a result of both increasing numbers of imported units and imports as a percentage of domestic consumption;
- o actual changes in U.S. mobilization capability to manufacture machine tools from 1978 through 1982;
- o projected changes in U.S. mobilization capability to manufacture machine tools from 1983 through 1985.

C. Findings by Type of Machine Tool

The following findings are presented for the specific categories of machine tools identified by the NMTBA, with the exception of "other metal-cutting" and "other metal-forming". After considerable deliberation, a negative finding was reached for the "other metal-cutting" and "other metal-forming" categories, without proceeding with the analytic steps previously described.

No systematic or reasonable means for disaggregating the "other" category into specific types of machine tools could be identified and used. Some machines in the "other" category are manufactured only by foreign suppliers. It therefore would be inimical to our security interests to adjust imports of these machines. Furthermore, mobilization capacity increased during the 1978-82 period.

1. Metal-cutting Machine Tools

Boring - There would be a shortfall during the mobilization year and year 1 of the conflict, and the shortfall could not be met by foreign suppliers. Imports as a percentage of domestic consumption have been increasing, while both domestic shipments and mobilization production capacity have declined.

Drilling - There would no shortfalls, machines are readily available from all major producers, imports are declining as a percentage of domestic consumption, and mobilization production capacity has increased significantly.

Gear Cutting - There would be no shortfalls and imports are readily available. Also, the absolute number of imports has decreased while mobilization capacity has increased.

Grinding and Polishing - There would be a shortfall which could not necessarily be met by reliable imports. However, there has been a decline in the absolute number of imports for the past three years, and there has been an increase in mobilization production capacity.

Horizontal NC Lathes - There would be a shortfall through the second conflict year. Imports are available from reliable suppliers, but are not adequate in number to meet requirements. Import penetration rose to 70% of domestic consumption in 1982, while U.S. shipments declined rapidly. Imports have impeded the growth of domestic industry needed to meet mobilization requirements.

Vertical NC Lathes - Based on domestic supplies, there would be a shortfall through the second conflict year. Imports are available from reliable suppliers, but are not adequate to meet requirements. Imports account for about two-thirds of the domestic market while domestic shipments are declining. Imports are impeding the growth of the industry needed for national security purposes.

Non-NC Lathes - Based on domestic supplies, there would be small shortfalls through the first conflict year and mobilization production capacity has declined slightly in the past five years. However, imports are available from reliable suppliers and imports have declined in absolute terms.

Milling - Based on domestic supplies, there would be a shortfall during the mobilization period and imports as a percentage of domestic consumption have risen. However, the foreign availability of milling machines is high and imports have declined in absolute terms since 1980.

Machining Centers - There would be a shortfall through the second conflict year, and it is uncertain whether the U.S. will be able to obtain sufficient deliveries from foreign suppliers to fill this gap. Also, imports as a percentage of domestic consumption have risen significantly. Domestic shipments are down. Imports are impeding the growth of the industry, which is needed for national security purposes.

Station Type - Based on domestic supplies, there would be a shortfall through the first conflict year. Reliable imports would be available, but probably not in adequate quantities to fill the gap. However, import penetration has been very low--any shortfall cannot be attributed to import penetration.

2. Metal-forming Machine Tools

Punching and Shearing - There would be a surplus of NC machines for all four years which could be used to partially meet the shortfall in non-NC machines--a shortfall which is expected to exist through the first conflict year. Reliable imports are expected to be available for both NC and non-NC categories, and

have remained essentially stable in absolute terms while domestic shipments have declined. Mobilization production capacity has more than doubled for NC machines, and declined only slightly for non-NC machines.

Bending and Forming - Based on domestic supplies, there would be a shortage of non-NC machines through the first conflict year and of NC machines during the mobilization period. Also, import penetration has increased for bending and forming machines overall. However, substantial quantities of both types of machines should be available prior to the outbreak of hostilities and mobilization production capacity has increased during the 1978-82 period.

Presses - Based on domestic supplies, there would be a shortfall through the first conflict year. However, imports are expected to be available during the mobilization period and during each war year. Imports as a percentage of domestic consumption have increased due to the fact that the absolute number of imports has remained stable in the face of declining domestic consumption. Any shortfall that may arise cannot be directly attributed to import penetration.

Boring - There would be a shortfall during the mobilization year and year 1 of the conflict, and the shortfall could not be met by foreign suppliers. Imports as a percentage of domestic consumption has been increasing, while both domestic shipments and production capacity have declined.

Drilling - There would no shortfalls, machines are readily available from all major producers, imports are declining as a percentage of domestic consumption, and mobilization capacity has increased significantly.

Gear Cutting - There would be no shortfalls and imports are readily available. Also, the absolute number of imports has decreased while mobilization capacity has increased.

Grinding and Polishing - There would be a shortfall which could not necessarily be met by reliable imports. However, there has been a decline in the absolute number of imports for the past three years, and there has been an increase in production capacity.

	Mob Year	Year 1	Year 2	Year 3
Requirements	4,560	4,406	2,765	1,378
Domestic Capacity	2,132	2,526	3,241	4,238
Domestic Inventory	246			
Importers Inventory	817			
DIPEC	919			
Total	4,114			
Domestic/Shortfall/ Surplus	- 446	-1,880	+ 476	+2,860

Domestic shortfall/surplus: The U.S. would have a shortfall of boring machines during the mobilization and during the first year of the conflict. For the later phase of the war, it is anticipated that U.S. production capabilities can meet and exceed declining demand.

Foreign availability: Boring machines are manufactured by all of the major foreign producers and can be delivered to the U.S. in 12-15 months. Commerce Department industry and trade analysts do not believe that the above noted shortfall could be met through reliable foreign suppliers in a timely manner.

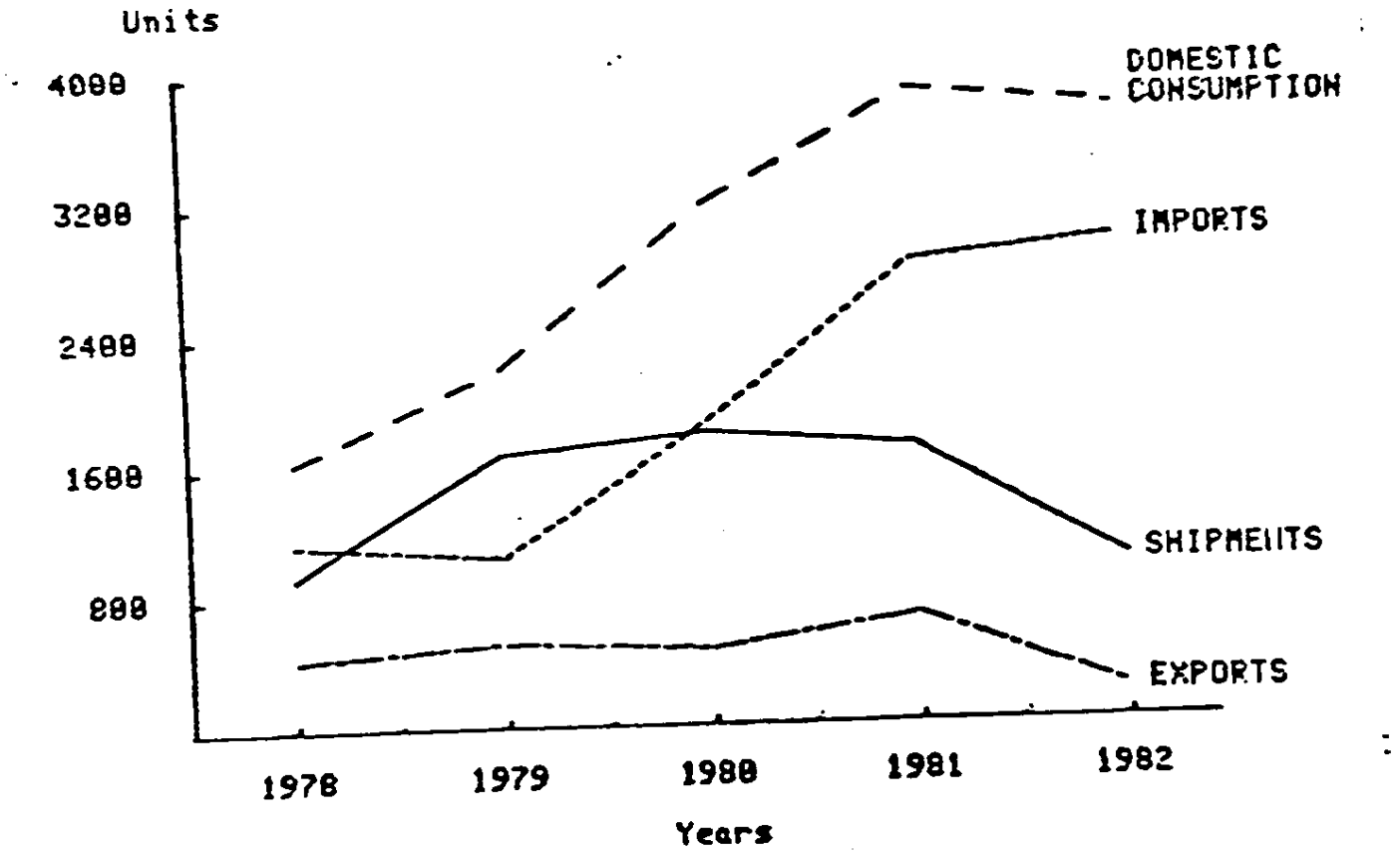
Fungibility: None. Substituting other machines is not practical due to the size of the parts to be machined.

Import penetration: Imports as a percentage of domestic consumption have been increasing since 1979. In 1979, the ratio of imports to consumption was 47%; in 1982, the level rose to 79%. (However, this level of import penetration is somewhat overstated for the purpose of this investigation because imports valued at less than $2500 are included in this total. DOC estimates that these low value foreign machines inflate the 1982 import penetration level by 20-30%.) While imports are increasing their share of the U.S. market, domestic shipments are declining rapidly. In absolute terms, shipments declined from 1671 machine tools in 1979 to 994 machine tools in 1982. During the 1979-82 period, U.S. shipments of boring machines declined 41%. During the first six months of 1983, U.S. shipments declined 82% compared with the first six months of 1982.

Mobilization Capacity: Declined during the 1978-82 period.

Conclusion: Positive finding. There are shortfalls that cannot be met by total available supplies. Imports have increased their share of the U.S. market at a rapid rate and now account for most of the domestic market. In fact, the absolute number of imports increased even during the economic recession. In light of these developments,

domestic shipments fell to only 120 machines during the first half of 1983, compared with 685 machines for the first six months of 1982. Unlike most other categories of machine tools, domestic capacity declined during the 1978-82 period, and the DOC survey anticipates no significant increases through 1985. The threat to national security would be further exacerbated by any additional loss of capacity resulting from import penetration.



Source: U.S. Department of Commerce, Bureau of the Census.

Drilling Machines

	Mob Year	Year 1	Year 2	Year 3
Requirements	12,172	11,809	7,252	4,091
Domestic Capacity	12,386	14,677	18,827	24,623
Domestic Inventory	889			
Importers Inventory	748			
DIPEC	1,160			
Total	15,183			
Domestic/Shortfall/ Surplus	+3,011	+2,868	+11,575	+20,532

Domestic Shortfall: None: The U.S. can meet mobilization and wartime demand for drilling machines without any imports.

Foreign Availability: Drilling machines are available from all the major producers and can be delivered to the U.S. in 4-6 months.

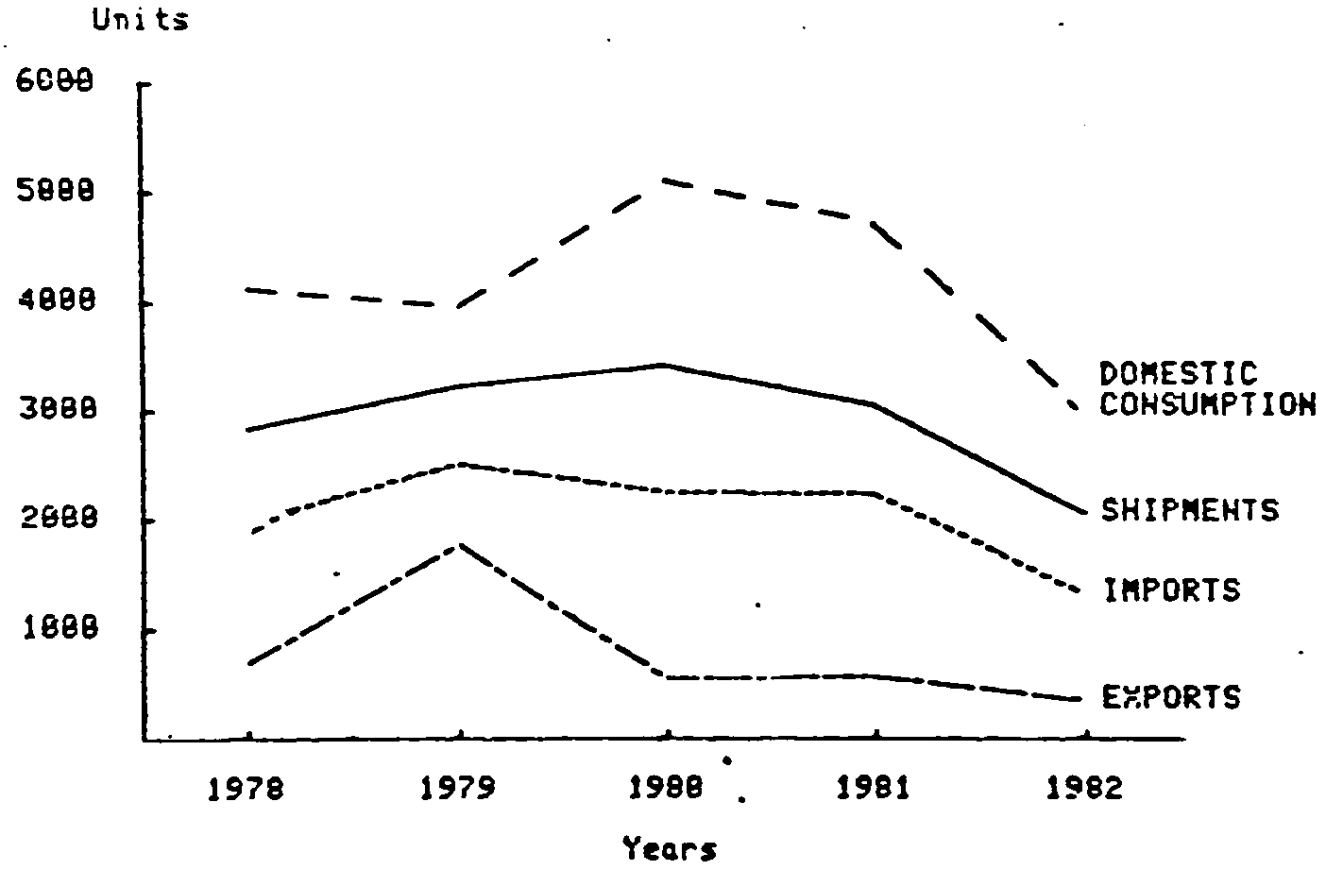
Fungibility: None.

Import Penetration: Imports as a percentage of domestic consumption have declined from a high of 63.3% in 1979 to 43.5% in 1982.

Mobilization Capacity: Increased significantly during 1978-82 period.

Conclusion: Negative finding.

DRILLING MACHINE TOOLS



Source: U.S. Department of Commerce, Bureau of the Census.